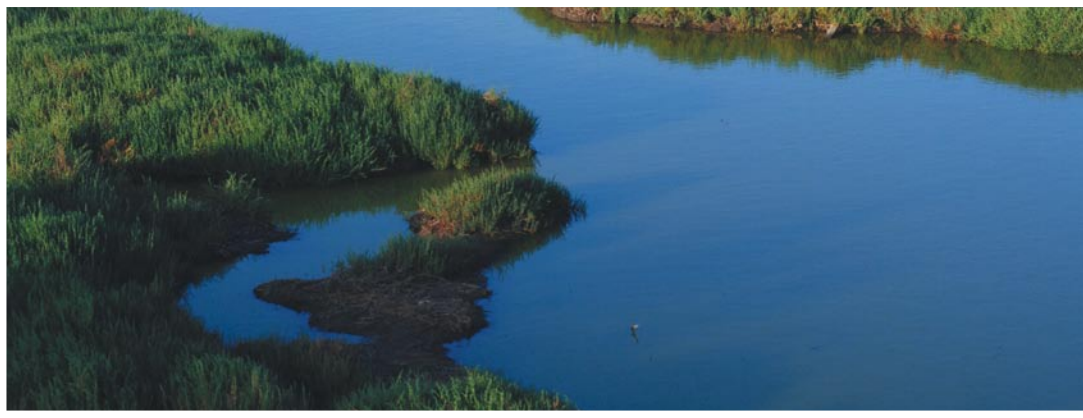
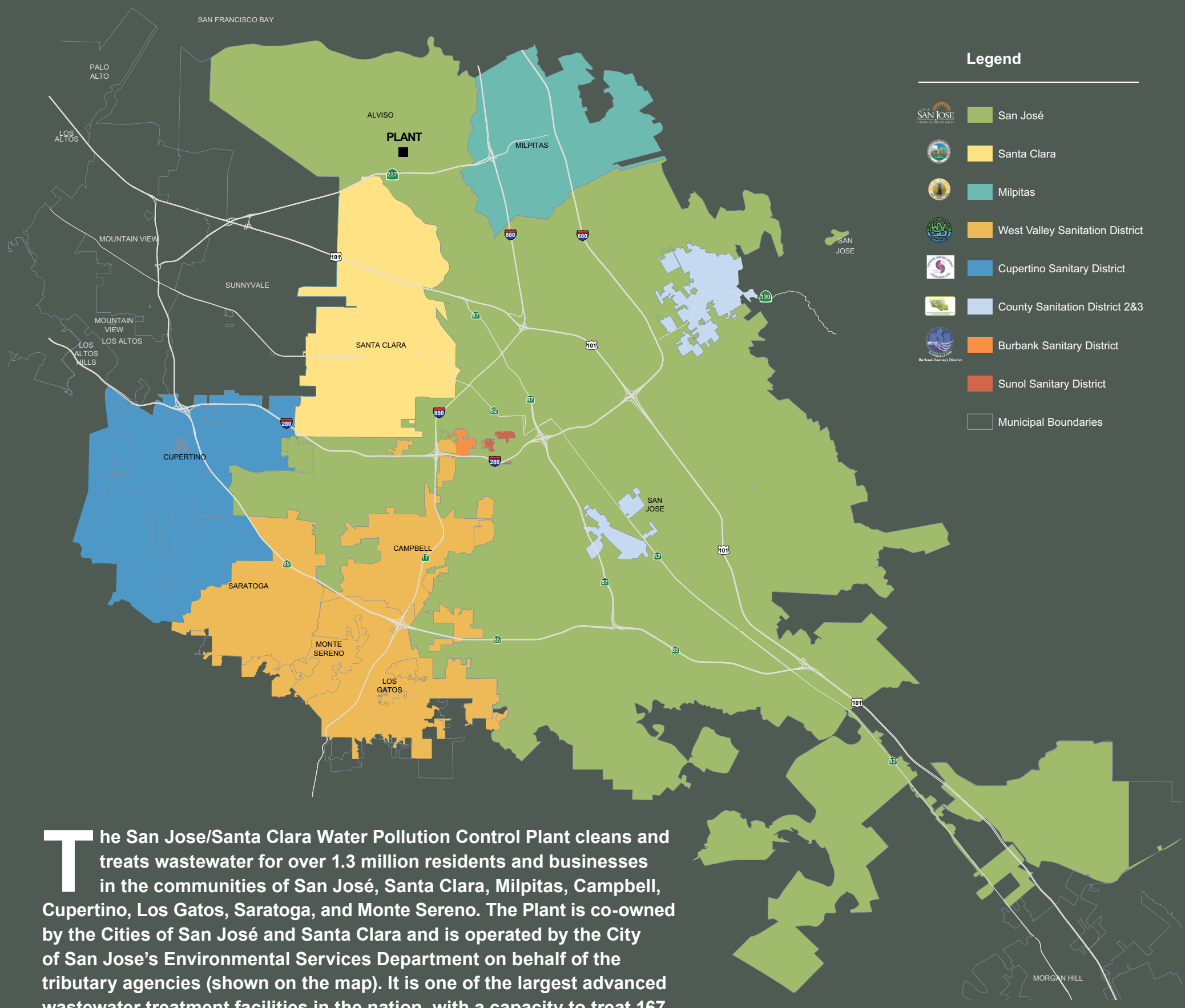
San Jose/Santa Clara Water Pollution Control Plant



50 Years of Regional Collaboration
Protecting the San Francisco Bay



The San Jose/Santa Clara Water Pollution Control Plant cleans and treats wastewater for over 1.3 million residents and businesses in the communities of San José, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno. The Plant is co-owned by the Cities of San José and Santa Clara and is operated by the City of San Jose's Environmental Services Department on behalf of the tributary agencies (shown on the map). It is one of the largest advanced wastewater treatment facilities in the nation, with a capacity to treat 167 million gallons of wastewater each day.

The Plant is located at the southernmost tip of San Francisco Bay. Since 1956, the Plant has protected the health of the south San Francisco Bay wetlands, which — along with the Alviso shoreline — make up the largest urban wildlife refuge in the United States.

Treating wastewater protects human health from pathogenic bacteria such as typhoid, cholera, dysentery, polio, and hepatitis. Prior to the Plant's construction, the South Bay changed color with each canning season and emitted unpleasant odors.

San Jose/Santa Clara Water Pollution Control Plant

Meeting the Changing Needs of the South Bay

TRIBUTARY POPULATION

INFLUENT FLOW TO PLANT

RECYCLED WATER DELIVERED

SOUTH BAY'S ECONOMY

- Agrarian
- Canneries
- Residential
- High-tech Manufacturing
- Corporate Headquarters

1890 — 22,603

1896 — Completion of 60-inch Brick Sewer Outflow to Mallard (Artesian) Slough

Allowed sewage to be discharged away from the urbanized area and into the South San Francisco Bay

1950 — 116,308

1956 — Original 36 MGD (million gallons per day) primary treatment plant constructed. Process also includes pretreatment, sludge digestion, and sludge lagoons

Primary treatment utilizes gravity to remove about 50% of impurities in wastewater

1959 — San Jose and Santa Clara sign joint powers agreement co-owning the Plant

1960 — 330,694

<37.3 MILLION GALLONS PER DAY[3]

1964 — Constructed secondary treatment system utilizing the activated sludge process. Added more primary treatment and digestion capacities. Constructed sludge concentration facilities to thicken sludge prior to digestion.

Secondary treatment utilizes naturally-occurring bacteria; 90% of wastewater impurities removed

1968 — Alviso annexed to the City of San José

1970 — 684,681

74.7 MILLION GALLONS PER DAY[2]

1972 — Clean Water Act Passed

1979 — Constructed nitrogen removal and filtration system

Advanced treatment utilizes filtration: 99% of wastewater impurities removed

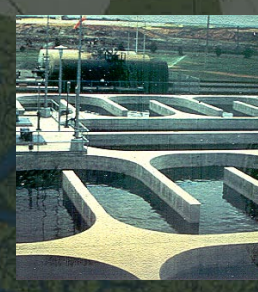
1980 — 892,749

105.6 MILLION GALLONS PER DAY[1]

1983 — Tributary agreement signed

1990 — 1,061,563

105.5 MILLION GALLONS PER DAY[1]



1998 — South Bay Water Recycling comes on-line

Treated wastewater that once went into the Bay is now reused for irrigation and cooling towers

1998 — Based on results from the In-plant Copper Reduction and Treatment Processes Optimization Program, converted from two-stage nitrification activated sludge process to a single-stage biological nutrient removal (BNR) process

Increase the capacity of the Plant and better utilizes the nitrification area

2000 — 1,210,604

131.1 MILLION GALLONS PER DAY[1]

4 MILLION GALLONS PER DAY

2005 — 1,231,487

119.2 MILLION GALLONS PER DAY[1]

10 MILLION GALLONS PER DAY

2006 — Inception of Plant Master Plan

Provides a framework for future development of the Plant

1 Derived from Self Monitoring reports and Plant Flow Data
2 Derived from Annual reports which were prepared for the years 1965 through 1977.
3 Derived from "A Comprehensive Study of the Waste Treatment Requirements for the Cities of San Jose and Santa Clara and Tributary Agencies Phase 1. Assimulative Capacity of South San Francisco Bay. Consoer, Townsend and Associates 1968

Map: San Francisco Estuary Institute

San Jose/Santa Clara Water Pollution Control Plant

How the Plant Works

Wastewater from sinks, toilets, and drains in homes, businesses, and schools can take up to 10 hours to travel through an underground pipe system — called the sanitary sewer — before arriving for treatment. Eighteen hours later, 99 percent of impurities are removed through a highly sophisticated treatment process that simulates and accelerates the way nature purifies water.

Water Treatment Process

The Plant's treatment process produces water that is 99% pure.

Wastewater from homes and businesses can take up to 10 hours before reaching the Plant.

Legend

- Solids
- Liquid
- Recycled water
- Storm drain runoff

Pretreatment

Upon arrival, the wastewater passes through vertical steel bar screens that remove large objects such as sticks, rocks, paper, and rags.

Wastewater then flows to grit chambers that remove heavier particles such as sand and gravel. These materials are taken to a landfill.

Primary Treatment

Wastewater is then pumped into settling tanks where it sits for approximately two hours in order to remove 50% of the remaining solids from the water by gravity.

Biological Treatment

The next step uses naturally-occurring bacteria to decompose organic material and ammonia, producing a reusable biosolid. A total of 90% of wastewater impurities is removed.

Clarification

Wastewater then flows into clarifier tanks where more solids settle and are removed.

Drying Beds

Biosolids are solar dried and reused as landfill cover.

Anaerobic Digester

Filtration

Wastewater is then run through a multi-layer filter bed of stone, sand, and anthracite coal that removes small suspended solids from the water.

Disinfection

Wastewater then travels through serpentine disinfection tanks for approximately 45 minutes.

South Bay Recycled Water

About 10% of the treated water is further treated and recycled through South Bay Water Recycling pipelines for landscaping, agricultural irrigation, and industrial needs.

Afterwards, residual chemicals are neutralized. With 99% of impurities removed, water now meets or exceeds many drinking water standards and has the appearance of fresh water.

San Francisco Bay

? What's the difference between a sanitary sewer and a storm drain?

Storm drains are separate from the sanitary sewer system. Water that enters the storm drain system flows directly to our creeks and Bay without treatment.

SAN JOSE/SANTA CLARA
WATER POLLUTION
CONTROL PLANT

The Many Functions of Bufferlands

In 1956, the San Jose/Santa Clara Water Pollution Control Plant and the surrounding baylands seemed far removed from urban development. The post-World War II years brought on urban expansion that began to encroach upon the Plant. Between the years of 1968 and 1981, the Plant purchased over 1,300 acres of neighboring farmland for facilities' expansion and bufferlands. Today, more than half of this land is used to process biosolids for beneficial use.

The bufferlands provide a significant security barrier for the Plant and buffer the community from light, noise, chemicals, and occasional odors that are associated with the wastewater treatment process. The bufferlands also afford the Plant the flexibility to plan for future expansion.

In 2005, the Plant bought 856 acres of additional bufferland, the former salt pond A18, from Cargill Salt. The planning for Pond A18 and the other bufferlands is a central component of the Plant Master Plan.

Bufferlands provide valuable habitat along Coyote Creek and are subject to a Santa Clara Valley Water District easement. This riparian corridor habitat provides refuge for birds, fish, and other animals as well as increased flood protection for North San José and Milpitas.

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Challenges for the Future: Aging Infrastructure

Every day, operators, engineers, maintenance and laboratory staff ensure the San José/Santa Clara Water Pollution Control Plant's continuous, 24/7 operation. The 50 years of nonstop operation has taken its toll on the Plant's infrastructure and current resources cannot keep pace with the needed repairs. The Plant Master Plan will establish priorities to repair or replace critical infrastructure that include an aging electrical system, anaerobic digesters, and the base concrete structures.

Wet Weather Reliability Project – Estimated Completion date: November 2007

The Plant's Wet Weather Reliability Improvement Project is the largest addition to the facility in 20 years, with a current budget of approximately $70 million. It includes the creation of a second, parallel headworks facility, a new raw sewage pump station, a supplemental filter influent pump station, and an 8.3 million gallon emergency overflow storage basin (pictured above).

The project will allow the Plant to handle short-duration flows up to 400 million gallons per day and will allow the Plant more time to respond and correct issues before environmental impacts can occur.

Biosolids Treatment and Disposal Options

One important process at the Plant is the management of the biosolids, one of the byproducts of the wastewater treatment process.

The biosolids go through thickening, anaerobic digestion, lagoon stabilization, and solar drying processes. The solar drying process is extremely cost effective and environmentally sustainable; however, it also requires a significant amount of land.

The process results in high quality (class A) biosolids, which are currently reused as alternate daily cover at the Newby Island Sanitary Landfill, but may have many other potential uses.

Another product is methane gas created by the anaerobic digestion process. The methane gas created at the Plant is used by engine generators to produce much of the Plant's electric power.

Part of the Plant Master Plan is to investigate options for processing biosolids and methane gas more efficiently and cost effectively.

Electrical and Power System Dependability Upgrades

The Plant electrical load demand on a daily basis is about 8 to 8.5 megawatts (MW). Of this amount, about 7 to 7.5 MW is generated on-site by massive generators that use a combination of digester gas, landfill gas, and natural gas as fuel source.

Electrical load at the Plant is used mainly to pump wastewater across the Plant and provide air to the biological treatment process. Since the Plant operates continuously, the electrical system must be operating at full capacity 24 hours a day, 7 days a week.

Any electrical outages can lead to negative environmental consequences. The Plant has managed to avoid these environmental impacts, but many of the electrical equipment and power distribution systems are reaching the end of their life expectancy.

An Electrical System Improvement Study was performed in 2004, to assess the reliability of the Plant's electrical system. The study identified the need to replace old switchgears, cables, and engine generators and upgrade existing power distribution system, which will also reduce greenhouse gas emissions. These efforts will take place in phases over several years with an estimated cost of over $56 million.

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Taking Up the Challenge for the Next 50 Years

For the past 50 years, the Plant has been one of the South Bay's most vital community assets, protecting the environment, economy and quality of life for residents of San José, Santa Clara and its tributary agencies. The Master Plan will undertake the challenges of the next 50 years and map out a sustainable, healthy, and responsible vision for future generations living or working in this area.

The following goals provide a framework for the Plant Master Plan:

- **Flexibility for Plant Uses**
  Operate more cost-effectively and anticipate future Plant needs for capacity, treatment, and reliability improvements
- **Regulatory Compliance**
  Meet and exceed current Federal, State, and regional regulatory requirements while providing new opportunities for recycled water utilization
- **Worker and Community Safety** Minimize toxic hazards and replace them with less hazardous alternatives
- **Habitat Protection and Restoration**
  Encourage environmentally positive outcomes consistent with the South Bay Salt Pond Restoration effort that will increase wildlife habitat, reduce flood risk, and conserve energy
- **Good Neighbor** Improve integration and acceptance with the local community by becoming an ecological asset of natural beauty and free of odor
- **Economic Opportunities/Public Value**
  Allow complementary, sustainable land uses that either generate revenue or reduce costs while providing flexibility for future growth
- **Continued Land Management** Ensure implementation of the plan's interim and permanent land uses by providing for dedicated staff to manage bufferlands

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